

ABSTRACT OF THE DISCLOSURE

A combination of techniques to prevent deadlocks and livelocks in a computer system having a dispatcher and multiple downstream command queues. In one
5 embodiment, a broadcast transaction that requires simultaneously available space in all the affected downstream command queues becomes a delayed transaction, so that the command queues are reserved and other transactions are retried until the broadcast transaction is completed. In another embodiment, a bail-out timer is used to defer a transaction if the transaction does not complete within a predetermined time. In yet
10 another embodiment, a locked transaction that potentially addresses memory space controlled by a programmable attribute map is handled as a delayed transaction if there is less than a predetermined amount of downstream buffer space available for the transaction.